

## Original Research Article

**An observational study on analysis of incidence of cardiovascular diseases in various stages of HIV****Kavya Pingali**<sup>1</sup>Assistant Professor, Department of Cardiology, Government General Hospital, Vijayawada, Andhra Pradesh, India

Received: 28-04-2021 / Revised: 17-06-2021 / Accepted: 18-07-2021

**Abstract**

**Objective:** To identify the incidence of cardiovascular diseases in various stages of HIV by clinical profile, electrocardiogram and echocardiography. **Methods:** A Prospective, clinical, and echocardiographic study conducted during a period of October 2020 to February 2021 on 100 patients who are treated in government general hospital, Vijayawada. The CD4 count, X-ray chest, ECG, and two-dimensional echocardiography were taken and cardiac findings were analyzed statistically. **Results:** Of 100 patients, there is occurrence of 18.18% of pericardial effusion, 22.72% of cardiomyopathy, 13.63% in pulmonary hypertension, 9.09% of left ventricular hypertrophy, and 13.63% of CAD, 4.54% of diastolic dysfunction, MVPS, and valvular heart disease. **Conclusion:** In the light of these results, it can be concluded that the Cardiac involvement and cardiovascular complications are commonly seen in HIV-infected patients and these complications are increasing with the increase of the stages of the HIV.

**Keywords:** Cardiovascular diseases, CD4 count, pericardial effusion, cardiomyopathy, Pulmonary hypertension, left ventricular hypertrophy, diastolic hypertension, CAD, and valvular heart disease.

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**Introduction**

Acquired immunodeficiency syndrome (AIDS) is characterized by an acquired, profound, irreversible immunosuppression that predisposes the patient to multiple opportunistic infections, malignant neoplasms, and a progressive dysfunction of multiple organ systems. The heart and great vessels are not the sites most frequently affected by opportunistic infections and neoplastic processes in patients with acquired immune deficiency syndrome (AIDS)[1]. However, cardiovascular complications occur in a significant number of such patients and are the immediate cause of death in some[2].

The prevalence of Cardiac involvement in AIDS patients has been reported to range between 28% and 73%[1]. Recent advance in the knowledge about human immunodeficiency virus (HIV) replication and the treatment of HIV infection have improved survival in HIV patients [2-4]. Because of the longer survival in HIV patients, the more manifestation of late-stage HIV infection will be seen, including HIV related cardiac diseases. As patients with HIV infection are living longer, they are at risk of developing chronic diseases, including coronary atherosclerosis too. The spectrum of cardiovascular complications of AIDS that may be depicted at imaging includes[5].

- a. Dilated cardiomyopathy
- b. Pericardial effusion
- c. Human immunodeficiency virus – associated pulmonary hypertension.
- d. Endocarditis
- e. Thrombosis
- f. Embolism
- g. Vasculitis
- h. Aneurysm
- i. Coronary artery disease
- j. Cardiac involvement in AIDS related tumors.

In this article, we review the pathophysiologic and imaging

manifestations of HIV and AIDS related cardiovascular complications.

**Aim**

To identify the incidence of cardiovascular diseases in various stages of HIV by clinical profile, electrocardiogram and echocardiography.

**Materials and methods**

A Prospective, clinical, and echocardiographic study conducted during a period of October 2020 to February 2021 on 100 patients who are treated in government general hospital, Vijayawada. The selected patients are HIV positive irrespective of their ART status. We excluded the patients who are with evidence of heart disease previous to the diagnosis of their HIV infection.

100 HIV-infected patients attending the Governmental General Hospital both as inpatients and outpatients who were positive for HIV antibodies were selected.

All the patients were given a thorough clinical examination that included a patient history and physical examination. Routine lab investigations like RFT, LFT, CBP, fasting blood sugar, total cholesterol, and CD4 count was taken. X-ray chest, ECG, and two-dimensional echocardiography were taken and cardiac findings were analyzed statistically.

**Results**

In the study echo cardiographic manifestations of 100 HIV patients were analyzed irrespective of their CD<sub>4</sub> count, stage of disease, and ART status. Among them 82% are males and 18% are females.

**Table 1: Percentage of Males and Females**

	No. of Patients	Percentage
Males	82	82%
Females	18	18%

\*Correspondence

**Dr. Kavya Pingali**

Assistant Professor, Department of Cardiology, Government General Hospital, Vijayawada, Andhra Pradesh, India

E-mail: [pingali.kavya@yahoo.com](mailto:pingali.kavya@yahoo.com)

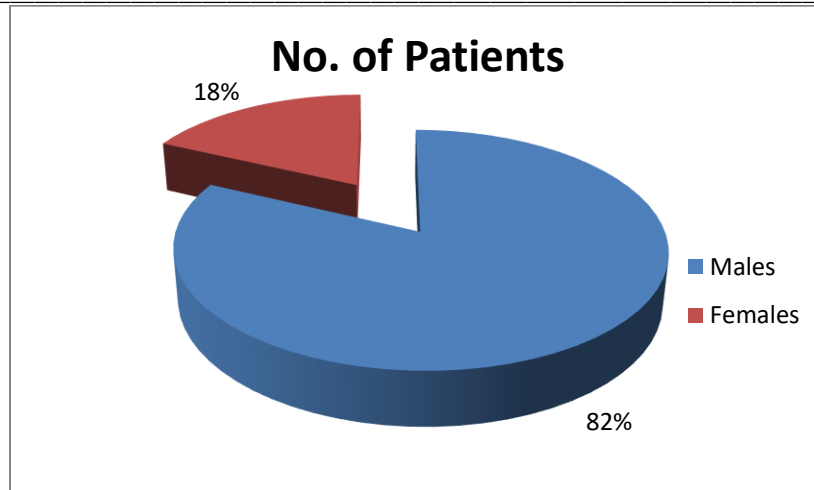


Figure 1: Gender distribution

They were staged according to WHO clinical staging of HIV/AIDS. 6% belong to stage 2, 50% belong to stage 3 and 44% belong to stage 4.

Table 2: Percentage of Various Clinical Stages of HIV Analysed

	No. of Patients	Percentage
Stage 1	0	0%
Stage 2	6	6%
Stage 3	50	50%
Stage 4	44	44%

Table 3: Percentage of Various Cardiac Diseases in HIV

	No. of Patients	Percentage
Pericardial Effusion	4	18.18%
Cardiomyopathy	5	22.72%
Pulmonary Hypertension	3	13.63%
Left Ventricular Hypertrophy	2	9.09%
CAD	3	13.63%
Diastolic Dysfunction	1	4.54%
MVPS	1	4.54%
Valvular Heart Disease	1	4.54%
Pulmonary Thrombo Embolism	1	4.54%
Mediastinal Mass	1	4.54%

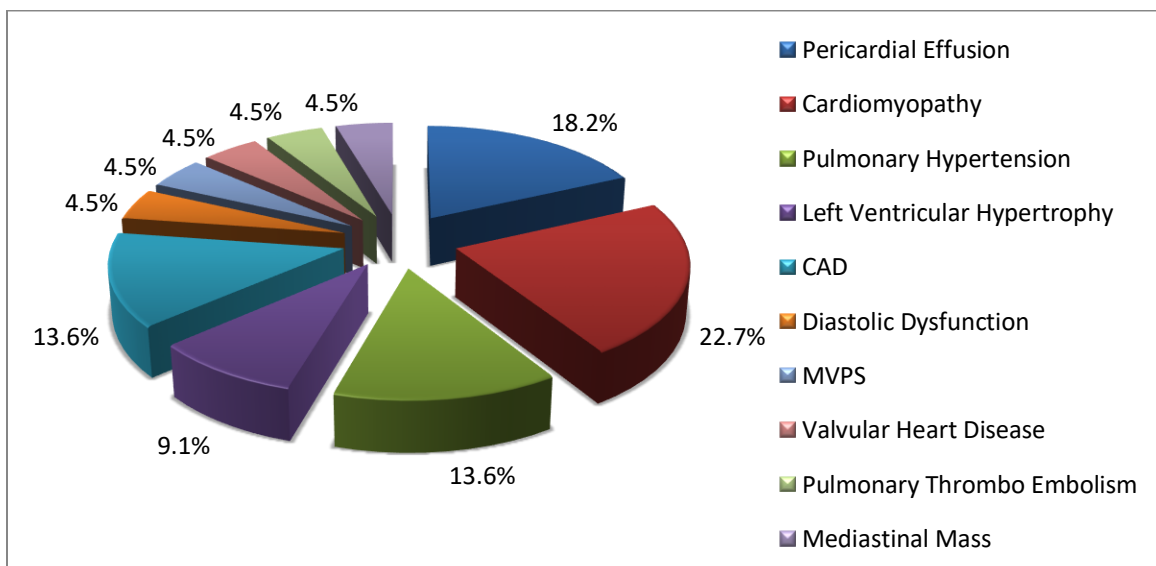
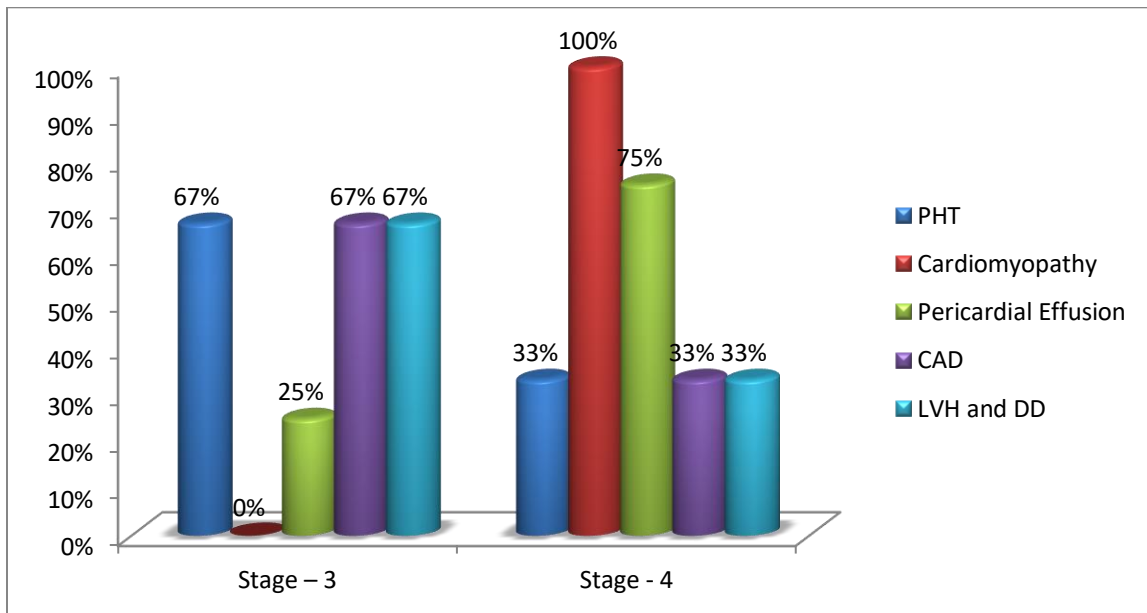


Figure 2: Various Cardiac Diseases in HIV

**Table 3: Comparison of Cardiac Problems between Various Stages**

	Stage - 3		Stage - 4	
	Count	Percentage	Count	Percentage
PHT	2	66.67%	1	33.33%
Cardiomyopathy	0	0%	5	100%
Pericardial Effusion	1	25%	3	75%
CAD	2	66.67%	1	33.33%
LVH and DD	2	66.67%	1	33.33%



**Figure 3: Comparison of Cardiac Problems between Various Stages**

**Discussion**

The overall incidence of cardiac manifestations is 22% among the HIV patients.

The incidence of cardiac manifestation in males is found to be 23.17% whereas it is 16.66% in females. Thus the incidence is found to be higher in males when compared to females.

Among the cardiac manifestations the most common is dilated cardiomyopathy 22.72% followed by pericardial effusion 18.18%. Incidence of other manifestations is coronary artery disease 13.63%, pulmonary hypertension 13.63%, left ventricular hypertrophy 9.09%, diastolic dysfunction 4.54%, mitral valve prolapse 4.54%, other valvular heart disease 4.54%, pulmonary thromboembolism 4.54% and mediastinal mass 4.54%.

Comparing various stages of HIV, in stage 2 one patient is found to have mitral valve prolapse syndrome. In Stage 3 the incidence is 18% and the incidence in stage 4 is 27.27%. This shows that incidence of cardiovascular manifestations, increases as the disease progresses.

When individual manifestations are compared, incidence of dilated cardiomyopathy and pericardial effusion is found to be higher in stage 4. The incidence is 100% and 75% respectively. Whereas the incidence of pulmonary hypertension, coronary artery disease, left ventricular hypertrophy and diastolic dysfunction is found to be more in stage 3. The incidences are 66.67% for each of these conditions.

Almost 86.37% of manifestations occur when CD<sub>4</sub> count is below 250.

On analyzing the risk factors for cardiac disease 78.95% of males consume alcohol and 84.21% of males smoke. All the females deny smoking and alcohol history. Incidence of Cardiac diseases increases in HIV patients who smoke and drink alcohol. Incidence of dyslipidemia is 22.73% with cardiac disease and inpatients without cardiac diseases 2.56%. So dyslipidemia increases the risk of cardiac diseases in HIV patients[8].

Incidence of systemic hypertension is 22.72% in patients with cardiac disease and in patients without cardiac disease is 2.56%[9].

Incidence of diabetes mellitus is 18.18% in patients with cardiac disease and in patients without cardiac disease is 1.28%. This shows that the presence of other risk factors like systemic hypertension and diabetes increases the incidence of cardiac diseases[10].

**Conclusion**

Cardiac involvement and cardiovascular complications are commonly seen in HIV-infected patients. As the epidemic progresses and new treatments help increase the long-term survival of affected individuals, cardiovascular complications will become more common. The common cardiovascular manifestation seen in HIV patients is dilated cardiomyopathy. The incidence of cardiovascular manifestation increases as the disease progresses. The presence of risk factors like systemic hypertension and diabetes further increases the risk of cardiac diseases. Strategies to prevent cardiovascular disease in HIV-infected patients should focus on reducing traditional risk factors, as well as HIV and ART-specific risk factors. Early recognition and prompt treatment are important to prevent significant morbidity from cardiac involvement. Whether this approach will prolong survival in AIDS patient's remains to be seen. It's important to stratify CVD risk in HIV-infected patients. Clinicians can use existing general risk stratification algorithms, such as the Framingham risk score, to measure HIV patients risk for heart disease. In essence, it means practicing good preventive medicine with all patients, including those who have HIV.

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**Conflict of Interest: Nil    Source of support: Nil**